2016 UDOT RESEARCH PROBLEM STATEMENT

****** Problem statement deadline is March 14, 2016. Submit statements to Tom Hales at tahales@utah.gov. ******

Title: Coping with traffic: how different residential locations affect personal travel and emissions **No. (office use):** 16.05.08

Submitted By: Douglas Eisinger, Ph.D. **Organization:** Sonoma Technology, Inc.

Email: doug@sonomatech.com **Phone:** 707-665-9900

UDOT Champion (suggested): Jeff Harris, Planning Director

Select One Subject Area

- ☐ Materials/Pavements
- ☐ Maintenance
- ☐ Traffic Mgmt/Safety
- ☐ Preconstruction
- ☒ Planning

1. Describe the problem to be addressed.

As part of its efforts to improve mobility, UDOT is helping local officials assess and communicate about different community growth options. A key need is to provide elected officials and the public with easy-to-understand materials showing how different community design choices can affect personal travel. The demand for this information is driven by demographics. Utah's population is projected to increase significantly, especially in urban areas and in the Wasatch Front region. Forecasted population growth poses significant challenges in Utah; the anticipated growth means competing demands to maintain and improve transportation options, preserve open spaces, provide affordable housing, and expand access to economic and community resources. In the Wasatch Front, several areas are choosing to address anticipated growth by encouraging compact, mixed-use development. These efforts seek to decrease travel distances between destinations, facilitate transit use and active transportation (walking, bicycling), reduce commute times, alleviate traffic congestion, and reduce travel-related air pollutant and greenhouse gas (GHG) emissions. Depending on how widely it is employed, compact, mixed-use development may help area residents decrease dependence on single-occupant-vehicle use and reduce some of the demand for costly, long-term highway capacity expansion. Development decisions that guide urban form have long-lasting implications for a community's "footprint." It is therefore important for individuals—especially those considering living in a compact community—to understand how different development types can affect travel mode choices, time spent traveling, and associated pollutant emissions. This research will develop public education materials that quantify, illustrate, and communicate travel activity and related emissions using household examples set in traditional suburban and compact, mixed-use locations.

2. Explain why this research is important.

There is a need for scientifically objective information to help explain to the general public how individual travel and travel-related emissions are influenced by the type of community in which they live, such as in a suburban or more compact, mixed-use setting. This research will provide UDOT planners with material to help communicate the potential outcomes from community design choices. It will help individuals envision how their time spent traveling (by car, public transit, cycling, or walking) might differ depending on residential setting. The information will improve public discussion and decision making about community plans.

3. List the research objective(s):

1. Illustrate how typical travel time and air pollutant/GHG emissions can vary by household and development type in Utah. Describe individuals in hypothetical households, illustrate their person-trips by travel mode, and help the general public envision how person-trips could vary in suburban versus compact, mixed-use communities.
2. Communicate the findings of research objective (1) in plain English resources such as PowerPoint slides and a brief, easy-to-follow, brochure.

4. List the major tasks:

1. Define hypothetical Utah households. For example, households to evaluate could be (a) two working adults, (b) two adults and two children, where one adult commutes to work and the other stays home, and (c) a single, retired adult.
2. For the assumed household occupants, characterize travel activity (trips per day, average trip distance and time) for weekday and weekend trips under two residential scenarios: (a) a low-density suburban area and (b) a compact, mixed-use area. Develop characterizations using readily available data from sources such as the Metropolitan Planning Organization (MPO), UDOT, U.S. Bureau of Transportation Statistics (BTS), or other Utah-specific studies or organizations.
3. Assign person-trips in each scenario to travel modes (e.g., light-duty vehicles, public transit, walking, cycling), and estimate travel times and speeds by mode and trip. Develop assignments using sources such as readily available Utah-specific data, national-level travel data, or travel and mode choice literature.
4. Quantify emissions of CO_2 and urban-scale pollutants (e.g., particulate matter) by combining the trip data from task (3) with

fleet-average emissions factors from the U.S. EPA MOVES model.

5. Summarize travel modes, travel times, and emissions by individual, household, and residential location type. Address approximately six scenarios (e.g., two residential location scenarios per household, for three example households).
6. Summarize results in a high-level, plain-English, brochure-style report, and provide a PowerPoint file of accompanying materials sufficient to support a 15- to 20-minute presentation for a general audience (e.g., at a public forum).

Optional tasks, depending on the availability of matching funds from UDOT Planning (either one of these or both may be selected by UDOT for support):

7. Assist in delivery of materials at public forums.
8. Attend and participate in local planning discussions on community design options. At these venues, present STI's UDOT-sponsored work under this funding; STI's UDOT-supported work addressing near-road pollutant exposure at sites in the Mountain View Corridor; and/or related STI materials developed under U.S. EPA sponsorship to educate the public on how to minimize exposure to near-road pollutants in areas of compact, mixed use development, and at school sites near roads.

5. List the expected results:

This research will help individuals in Utah better understand how residential location choice can affect travel activity and emissions. The findings will inform public debate and decision making among elected officials as communities weigh community design options to accommodate growth.

6. Describe how this research will be implemented.

UDOT planning staff involved in community engagement will use the materials when conducting outreach and education work at the local level. The materials will also be made available to local officials who will be able to distribute and use them in public forums, or make them available via the Internet. Optionally, STI can assist UDOT in the public delivery of research findings.

7. Requested from UDOT: $50,000 without options; an additional $17,000 per option if funded by UDOT Planning
Other/Matching Funds: $TBD **Total Cost:** $50,000 (no options); $67,000 to $84,000 with options

8. Outline the proposed schedule, including start and major event dates.

For planning purposes, we assume this project will begin by September 1, 2016, and take no longer than 12 months (without options). Work can begin and end earlier, depending on contract execution. Shaded fields show task durations.

Task	1st quarter	2nd quarter	3rd quarter	4th quarter	Optional tasks (up to 3 months)
1. Define hypothetical Utah households					
2. Characterize household travel activity by individual occupant					
3. Assign trips to travel modes, estimate travel time/speeds					
4. Quantify emissions					
5. Summarize findings on travel and emissions					
6. Prepare high-level draft and final versions of a plain English report and a PowerPoint presentation: • Draft report and PowerPoints by start of 4th quarter • Two-week UDOT comment period • Final products approximately two weeks after receipt of UDOT comments (depending on comments)					
Options (each would cost approximately $17,000): 7. Assist in delivery of materials at public forums 8. Attend and participate in local planning discussions					